Actionable Patient Safety Solution (APSS) #2B: CATHETER-ASSOCIATED URINARY TRACT INFECTIONS (CAUTI)

Executive Summary Checklist

In order to establish a program to eliminate Catheter-associated Urinary Tract Infections (CAUTI) an implementation plan with the following actionable steps must be completed. (This checklist was adapted from the core prevention strategies recommended by the CDC. ¹)

- Hospital governance and senior administrative leadership must champion efforts to raise awareness of the high incidence of CAUTIs and prevention measures.

- Healthcare leadership must support the design and implementation of standards and training programs on catheter insertion and manipulation.
  - Insert catheters only for appropriate indications
  - Ensure that only properly trained persons insert and maintain catheters
  - Insert catheters using aseptic technique and sterile equipment
  - Maintain unobstructed urine flow
  - Perform perineal care routinely for patients who have indwelling catheters to reduce the risk of skin breakdown and irritation
  - Remove catheters as soon as possible

- Following aseptic insertion, maintain a closed drainage system

- Senior leadership must address barriers, provide resources (budget/personnel), and assign accountability throughout the organization.

- Select technology has shown early success to reduce infections and/or positively enhance outcomes of patients and providers in frontline CAUTI prevention..

The Performance Gap

Urinary tract infections are the most common nosocomial infection, accounting for up to 40% of infections reported in acute care hospitals. There are an estimated 560,000 nosocomial UTIs annually in the United States with an estimated cost of $450 million annually. Up to 80% of UTIs are associated with the presence of an indwelling urinary catheter.

A catheter-associated urinary tract infection (CAUTI) increases hospital cost and is associated with increased morbidity and mortality. There are an estimated 13,000 deaths annually attributable to CAUTIs. CAUTIs are considered by the Centers for Medicare and Medicaid Services to represent a reasonably preventable complication of hospitalization. As such, no additional payment is provided to hospitals for CAUTI treatment-related costs.

Urinary catheters are used in 15-25% of hospitalized patients, and are often placed for inappropriate indications. According to a 2008 survey of U.S. hospitals >50% did not monitor which patients were catheterized, and 75% did not monitor duration and/or discontinuation. The pathogenesis of CAUTIs may occur early at insertion or late by capillary action, or occur due to a break in the closed drainage tubing or contamination of collection bag urine. The source of the organisms may be endogenous (meatal, rectal, or vaginal colonization) or exogenous, usually via contaminated hands of healthcare personnel during catheter insertion or manipulation of the collecting system.

Prevention strategies have been recommended by HICPAC/Centers for Disease Control and Prevention. The Core Strategies are supported by high levels of scientific evidence and demonstrated feasibility, whereas the Supplemental strategies are supported by less robust evidence and have variable levels of feasibility.

Core Prevention Measures include:

- Insert catheters only for appropriate indications

---

● Compliance with evidence-based guidelines e.g. Surgical Care Improvement Project (SCIP-Inf-9) requires urinary catheter removal on Postoperative Day 1 (POD1) or Postoperative Day 2 (POD 2) with day of surgery being day zero
● Leave catheters in-place only as long as needed
● Only properly trained persons insert and maintain catheters
● Insert catheters using aseptic technique and sterile equipment
● Maintain a closed drainage system
● Maintain unobstructed urine flow
● Hand hygiene and standard (or appropriate) isolation precautions

Supplemental Prevention Measures include:
● Alternatives to indwelling urinary catheterizations
● Portable ultrasound devices to reduce unnecessary catheterizations

The following practices are NOT recommended for CAUTI prevention (HICPAC guidelines):
● Complex urinary drainage systems
● Changing catheters or drainage bags at routine, fixed intervals
● Routine antimicrobial prophylaxis
● Cleaning of periurethral area with antiseptics while catheter is in place
● Irrigation of bladder with antimicrobials
● Instillation of antiseptic or antimicrobial solutions into drainage bags
● Routine screening for asymptomatic bacteriuria (ASB)

Prior to the implementation of new preventive measures, an evaluation should assess baseline policies and procedures with regard to CAUTI. New policies and practices should be tracked once implemented to ensure adherence and to remove any barriers to effective change.

Leadership Plan
● Hospital governance and senior administrative leadership must champion efforts in raising awareness around the high incidence of CAUTIs and prevention measures.
● Healthcare leadership should support the design and implementation of standards and training programs on catheter insertion and manipulation
● Senior leadership will need to address barriers, provide resources (budget/personnel), and assign accountability throughout the organization
● Leadership commitment and action are required at all levels for successful process improvement

Practice Plan
● Reduce the use and duration of use of urinary catheters
  ○ While there have been multiple attempts to deploy antimicrobial catheters to reduce the rate of infection, there is no literature to support that this technology has made a significant impact.
  ○ It has been estimated that 80% of hospital-acquired UTIs are directly attributable to use of an indwelling urethral catheter and studies have shown that there is a very high utilization in patients where it was not indicated or for durations that may have been longer than clinically necessary.

Thus the greatest opportunities to reduce the rate of UTI are 1) to place catheters only for appropriate indications and 2) to limit the duration of catheter placement.

Technology Plan

Suggested practices and technologies are limited to those proven to show benefit or are the only known technologies with a particular capability. As other options may exist, please send information on any additional technologies, along with appropriate evidence, to info@patientsafetymovement.org.

Consider implementing an anti-infective Foley catheter kit with enhanced components to prepare, insert and maintain a safe urinary catheter. One standard kit that has been effective:

- BARDEX® I.C. Advance Complete Care® Trays
Metrics

Topic:

Catheter-associated urinary tract infections (CAUTI)
Rate of patients with CAUTI per 1,000 Foley-days – all inpatient units

Outcome Measure Formula:

**Numerator:** Catheter-associated urinary tract infections based on CDC NHSN definitions for all inpatient units

**Denominator:** Total number of urinary catheter-days for all patients that have an indwelling urinary catheter (48 hours or more) in all tracked units

*Rate is typically displayed as CAUTI/1000 Foley-days*

Metric Recommendations:

**Indirect Impact:**
All patients with conditions that lead to temporary or permanent incontinence

**Direct Impact:**
All patients that require a Foley catheter

**Lives Spared Harm:**

\[
Lives = (\text{CAUTI RATE } \text{baseline} - \text{CAUTI Rate } \text{measurement}) \times (\text{Foley} \text{ days} \text{ baseline})
\]

Notes:

To meet the NHSN definitions, infections must be validated using the hospital acquired infection (HAI) standards. Infection rates can be stratified by unit types further defined by CDC. Infections that were present on admission (POA) are not considered HAIs and not counted.

Data Collection:
CAUTI and Foley-days can be collected through surveillance (at least once per month) or gathered through electronic documentation. Denominator documented electronically must match manual counts (+/- 5%) for a 3 month validation period.

CAUTI can be displayed as a Standardized Infection Ratios (SIR) using the following formula:

\[
SIR = \frac{\text{Observed CAUTI}}{\text{Expected CAUTI}}
\]

Expected infections are calculated by NHSN and available by location (unit type) from the baseline period.

---

Mortality (will be calculated by the Patient Safety Movement Foundation):

The PSMF, when available, will use the mortality rates associated with Hospital Acquired Conditions targeted in the Partnership for Patient’s grant funded Hospital Engagement Networks (HEN). The program targeted 10 hospital acquired conditions to reduce medical harm and costs of care. “At the outset of the PfP initiative, HHS agencies contributed their expertise to developing a measurement strategy by which to track national progress in patient safety—both in general and specifically related to the preventable HACs being addressed by the PfP. In conjunction with CMS’s overall leadership of the PfP, AHRQ has helped coordinate development and use of the national measurement strategy. The results using this national measurement strategy have been referred to as the “AHRQ National Scorecard,” which provides summary data on the national HAC rate (13). Catheter Associated Urinary Tract Infections was included in this work with published metric specifications. This is the most current and comprehensive study to date. Based on these data the estimated additional inpatient mortality for Catheter Associated Urinary Tract Infection Events is 0.023 (23 per 1000 events).

---

Workgroup

Chair:
Peter Cox, MD, SickKids

Members:
Paul Alper, DebMed, Electronic Hand Hygiene Compliance Organization (EHCO)
Steven Barker, PhD, MD, Patient Safety Movement Foundation, Masimo, University of Arizona
Robin Betts, MBA-HM, RN, Intermountain Healthcare
Alicia Cole, Patient Advocate
Helen Haskell, MA, Mothers Against Medical Errors (MAME)
Ariana Longley, MPH, Patient Safety Movement Foundation
Caroline Puri Mitchell, Fitsi Health
Kathy Puri, Fitsi Health
Brent Nibarger, Patient Advocate
Anna Noonan, RN, University of Vermont Medical Center
Kate O’Neill, iCare Quality
Barbara Quinn, MSN, ACNS-BC, Sutter Medical Center Sacramento
Yisrael Safeek, MD, SafeCare Group
Augusto Sola, MD, Masimo

Metrics Integrity:
Nathan Barton, Intermountain Healthcare
Robin Betts, RN, Intermountain Healthcare
Jan Orton, RN, MS, Intermountain Healthcare